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Lake Jessie
Polk County, Florida

(U.S.) National Eutrophication Survey, Corvallis, OR

Prepared for

Corvallis Environmental Research Lab, OR

Dec 77

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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

REPORT

ON

LAKE JESSIE

POLK COUNTY

FLORIDA

EPA REGION IV

WORKING PAPER No. 259

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON

and

ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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REPORT

ON

LAKE JESSIE

POLK COUNTY

FLORIDA

EPA REGION IV

WORKING PAPER No. 259

WITH THE COOPERATION OF THE

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

AND THE

FLORIDA NATIONAL GUARD

DECEMBER, 1977

CONTENTS

	Page
Forward	ii
List of Florida Lakes	iv
Lake and Drainage Area Map	v
Sections	
I. Introduction	1
II. Conclusions	1
III. Lake and Drainage Basin Characteristics	4
IV. Lake Water Quality Summary	5
V. Nutrient Loadings	9
VI. Literature Reviewed	13
VII. Appendices	14

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Florida Department of Environmental Regulation for professional involvement and to the Florida National Guard for conducting the tributary sampling phase of the Survey.

Joseph W. Landers, Jr., Secretary of the Department of Environmental Regulation; John A Redmond, former Director of the Division of Planning, Technical Assistance, and Grants; and Dr. Tim S. Stuart, Chief of the Bureau of Water Quality, provided invaluable lake documentation and counsel during the survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

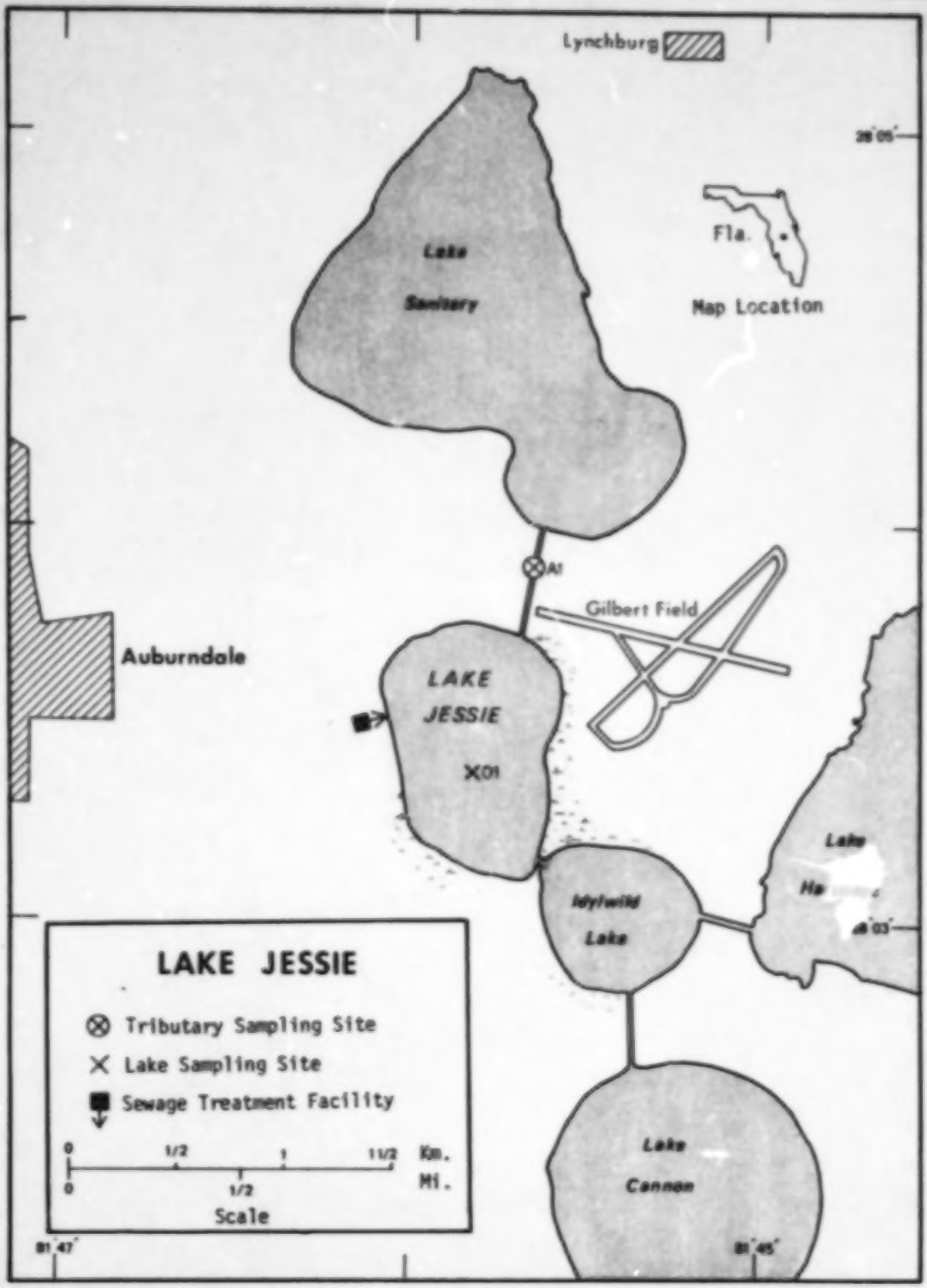
Major General Henry W. McMillan (Retired), then the Adjutant General of Florida, and Project Officer Colonel Hugo F. Windham, who directed the volunteer efforts of the Florida National Guard, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF FLORIDA

LAKE NAME	COUNTY
Alligator	Columbia
Apopka	Lake, Orange
Banana	Polk
Crescent	Flagler, Putnam
Doctors	Clay
Dora	Lake
East Tohopekaliga	Osceola
Effie	Polk
Eloise	Polk
George	Putnam, Volusia
Gibson	Polk
Glenada	Highlands
Griffin	Lake
Haines	Polk
Hancock	Polk
Horseshoe	Seminole
Howell	Orange, Seminole
Istokpoga	Highlands
Jessie	Polk
Jessup	Seminole
Kissimmee	Osceola
Lawne	Orange
Lulu	Polk
Marion	Polk
Minnehaha	Orange
Minneola	Lake
Monroe	Seminole, Volusia
Munson	Leon
Okeechobee	Glades, Hendry, Martin, Okeechobee, Palm Beach
Poinsett	Brevard, Orange, Osceola
Reedy	Polk
Seminole	Jackson, FL; Decatur, Seminole, GA
Seminole	Pinellas
South	Brevard
Talquin	Gadsden, Leon
Tarpon	Pinellas
Thonotosassa	Hillsborough
Tohopekaliga	Osceola
Trout	Lake
Weohyakapka	Polk
Yale	Lake


Lynchburg
28°05'
Fla.
Map Location
Lake
Sanitary
A1
Gilbert Field
Auburndale
LAKE
JESSIE
X01
Idylwild
Lake
Lake
Ha
03'
Lake
Cannon
81°47'
81°45'
LAKE JESSIE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
0
1/2
1
1 1/2
Km.
0
1/2
Mi.
Scale

LAKE JESSIE

STORET NO. 1258

I. INTRODUCTION

Lake Jessie is one of the Winter Haven chain of lakes. The hydrology of this chain is complex, and the U.S. Geological Survey questions whether realistic analyses of nutrient loadings to the lakes can be made; i.e., depending on the operation of control gates, wind direction and velocity, and other factors, flows in the connecting canals may have reversed from one sampling time to the next (Anderson, 1974).

II. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Lake Jessie is eutrophic. It ranked ninth in overall trophic quality when the 41 Florida lakes sampled in 1973 were compared using a combination of six parameters*. Eleven lakes had less median total phosphorus, six had less and one had the same median dissolved phosphorus, five had less median inorganic nitrogen, 16 had less mean chlorophyll a, and five had greater mean Secchi disc transparency.

Survey limnologists noted that emergent aquatic vegetation was present in the shallows along about half of the shoreline in November.

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* See Appendix A.

B. Rate-Limiting Nutrient:

The algal assay results are not considered indicative of conditions in the lake at the time of sampling. The lake data indicate nitrogen limitation at all sampling times.

C. Nutrient Controllability:

1. Point sources--During the sampling year, the only known point source, the Flamingo Shores MHP wastewater treatment plant contributed an estimated 1.6% of the total phosphorus input to Lake Jessie.

The estimated sampling year phosphorus loading of 3.25 g/m^2 is more than eight times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading. Assuming non-point loading estimates are reasonable, it appears that complete phosphorus removal at the point source would still leave a loading well in excess of the eutrophic loading; and even though Florida lakes may assimilate phosphorus at higher levels than those suggested by Vollenweider (see page 12), it does not seem likely that point-source phosphorus reduction would result in a significant improvement in the trophic condition of the lake.

2. Non-point sources--It is estimated that 61% of the phosphorus input to Lake Jessie was contributed by the Lake Sanitary drainage basin. It is likely that control of phosphorus resulting from agricultural activities around Lake Sanitary would be necessary to significantly reduce this input to Lake Jessie.

Minor tributaries and immediate drainage contributed an estimated 36% of the total phosphorus loading to Lake Jessie. Some urban development is presently occurring on the south and west shores, and an airport is located near the east shore. Citrus groves are also located within the drainage basin.

III. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Morphometry††:

1. Surface area: 0.77 kilometers^2.
2. Mean depth: 2.0 meters.
3. Maximum depth: 3.3 meters.
4. Volume: 1.540 x 10^6 m^3.
5. Mean hydraulic retention time: 162 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area km^2)*	Mean Flow (m^3/sec)**
Unnamed Canal A-1	7.4	0.07
Minor tributaries & immediate drainage -	4.4	0.04
Totals	11.8	0.11

2. Outlet -

Outlet Canal	12.6***	0.11***

C. Precipitation****:

1. Year of sampling: 112.8 centimeters.
2. Mean annual: 134.1 centimeters.

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† Table of metric conversions--Appendix B.
†† Anonymous, 1971; depths estimated from soundings reported in Appendix D.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Based on net effects of factors affecting flows in connecting canals during the period of October, 1960, through September, 1968 (Anderson, 1974).
*** Includes area of lake; outflow assumed to equal sum of inflows.
**** See Working Paper No. 175.

IV. WATER QUALITY SUMMARY

Lake Jessie was sampled three times during 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two or more depths at one station on the lake (see map, page v). During each visit, a single depth-integrated (near bottom to surface) sample was collected for phytoplankton identification and enumeration, and a similar sample was taken for chlorophyll a analysis. During the first visit, a single 18.9-liter depth-integrated sample was collected for algal assays. The maximum depth sampled was 2.7 meters.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE JESSIE
STORET CODE 1258

	1ST SAMPLING (3/ 8/73) 1 SITE			2ND SAMPLING (9/ 4/73) 1 SITE			3RD SAMPLING (11/ 6/73) 1 SITE		
PARAMETER	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN
TEMP (C)	20.5 - 24.0	22.5	23.1	28.8 - 29.1	28.9	28.9	23.7 - 23.8	23.8	23.8
DISS OXY (MG/L)	8.8 - 10.2	9.5	9.5	4.2 - 7.0	5.6	5.6	7.8 - 8.2	8.0	8.0
CNDCTVY (MCROMO)	200. - 200.	200.	200.	196. - 199.	198.	198.	170. - 170.	170.	170.
PH (STAND UNITS)	8.3 - 9.1	8.7	8.9	8.7 - 9.2	8.9	8.9	6.9 - 7.1	7.0	7.0
TOT ALK (MG/L)	41. - 42.	42.	42.	42. - 42.	42.	42.	31. - 31.	31.	31.
TOT P (MG/L)	0.030 - 0.051	0.042	0.039	0.049 - 0.055	0.052	0.052	0.059 - 0.071	0.065	0.065
ORTHO P (MG/L)	0.006 - 0.017	0.009	0.007	0.014 - 0.029	0.021	0.021	0.011 - 0.019	0.015	0.015
NO2+NO3 (MG/L)	0.046 - 0.150	0.087	0.050	0.060 - 0.090	0.075	0.075	0.020 - 0.030	0.025	0.025
AMMONIA (MG/L)	0.040 - 0.040	0.040	0.040	0.060 - 0.080	0.070	0.070	0.040 - 0.060	0.050	0.050
KJEL N (MG/L)	0.800 - 0.400	0.467	0.400	0.800 - 1.600	1.200	1.200	0.500 - 0.800	0.650	0.650
INORG N (MG/L)	0.086 - 1.094	0.507	0.094	0.120 - 0.170	0.145	0.145	0.060 - 0.090	0.075	0.075
TOTAL N (MG/L)	0.940 - 0.950	0.913	0.950	0.890 - 1.600	1.275	1.275	0.520 - 0.830	0.675	0.675
CHLRPYL A (UG/L)	20.8 - 20.8	20.8	20.8	32.6 - 32.6	32.6	32.6	25.5 - 25.5	25.5	25.5
SECCHI (METERS)	1.5 - 1.5	1.5	1.5	1.0 - 1.0	1.0	1.0	1.1 - 1.1	1.1	1.1

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
03/08/73	1. Raphidiopsis sp.	23,636
	2. Microcystis sp.	3,273
	3. Tetraedron sp.	2,181
	4. Synedra sp.	2,181
	5. Crucigenia sp.	1,818
	Other genera	10,366
	Total	43,455
09/04/73	1. Oscillatoria sp.	2,406
	2. Flagellates	2,406
	3. Cryptomonas sp.	2,406
	4. Dactylococcopsis sp.	1,636
	5. Cyclotella sp.	1,540
	Other genera	11,647
	Total	22,041
11/06/73	1. Flagellates	9,121
	2. Pennate diatoms	5,568
	3. Microcystis sp.	4,383
	4. Centric diatoms	3,317
	5. Dactylococcopsis sp.	2,843
	Other genera	18,472
	Total	43,704

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
03/08/73	1	20.8
09/04/73	1	32.6
11/06/73	1	25.5

C. Limiting Nutrient Study:

The algal assay results are not considered indicative of conditions in Lake Jessie at the time of sampling (03/08/74) because of substantial changes in nutrient concentrations in the sample between the time of collection and the beginning of the assay.

The lake data indicate nitrogen limitation; i.e., mean inorganic nitrogen/orthophosphorus ratios were 11/1 or less at all sampling times.

V. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Florida National Guard collected monthly near-surafce grab samples from each of the tributary sites indicated on the map (page v). Sampling was begun in March, 1973, and was completed in February, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Florida District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for Unnamed Canal A-1 were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads in the unsampled outlet canal were calculated with the estimated mean outflow and the mean nutrient concentrations in the lake.

Nutrient loads for unsamples "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the nutrient loads, in $kg/km^2/year$, at station A-1 and multiplying by the ZZ area in km^2.

The operator of the Flamingo Shores wastewater treatment plant provided monthly effluent samples and corresponding flow data.

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* See Working Paper No. 175.

A. Waste Sources:

1. Known municipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Flamingo Shores MHP	140	act. sludge + pond	12.6	Lake Jessie

2. Known industrial - None

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Unnamed Canal A-1	1,525	61.0
b. Minor tributaries & immediate drainage (non-point load) -	905	36.2
c. Known municipal STP's -		
Flamingo Shores MHP	40	1.6
d. Septic tanks - Unknown	?	-
e. Known industrial - None	-	-
f. Direct precipitation* -	30	1.2
Total	2,500	100.0

2. Outputs -

Outlet Canal - 160

3. Net annual P accumulation - 2,340 kg.

* Brezonik and Shannon, 1971.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (non-point load) -		
Unnamed Canal A-1	4,195	57.7
b. Minor tributaries & immediate drainage (non-point load) -	2,495	34.3
c. Known municipal STP's -		
Flamingo Shores MHP	125	1.7
d. Septic tanks - Unknown	?	-
e. Known industrial - None	-	-
f. Direct precipitation* -	450	6.2
Total	7,265	100.0

2. Outputs -

Outlet Canal - 2,990

3. Net annual N accumulation - 4,275 kg.

D. Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Unnamed Canal A-1	206	567

* Brezonik and Shannon, 1971.

E. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). However, note that Florida lakes may be able to assimilate phosphorus at a somewhat higher level than that suggested by Vollenweider (Shannon and Brezonik, 1972).

Essentially, Vollenweider's "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	3.25	3.04	9.4	5.6

Vollenweider phosphorus loadings ($g/m^2/yr$) based on estimated mean depth and hydraulic retention time of Lake Jessie:

"Dangerous" (eutrophic loading)	0.40
"Permissible" (oligotrophic loading)	0.20

VI. LITERATURE REVIEWED

Anderson, Warren, 1974. Personal communication (hydrology of Winter Haven chain of lakes). U.S. Geol. Surv., Winter Park.

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VII. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	SEC- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
1201	ALLIGATOR LAKE	0.026	0.200	474.000	07.733	13.100	0.390
1202	LAKE APOPKA	0.102	0.230	444.170	49.611	8.200	0.019
1203	LAKE BANANA	0.660	0.260	482.667	204.600	3.600	0.293
1206	LAKE CRESCENT	0.005	0.130	473.444	10.211	10.200	0.033
1207	DUCTOWN LAKE	0.004	0.120	465.555	27.100	10.600	0.028
1208	LAKE DORA	0.102	0.240	482.664	54.478	7.400	0.022
1209	LAKE EFFIE	1.403	0.410	484.000	261.433	15.000	0.950
1210	LAKE GEORGE	0.129	0.165	464.384	35.000	11.000	0.063
1211	LAKE GIBSON	0.107	0.115	478.000	19.675	10.200	0.009
1212	GLENADA LAKE	0.134	0.105	454.107	27.667	14.700	0.072
1214	LAKE GRIFFIN	0.119	0.200	481.333	66.855	6.600	0.036
1215	LAKE HAINES	0.063	0.115	462.667	20.567	10.600	0.014
1217	LAKE HANCOCK	0.772	0.195	483.500	97.900	5.600	0.150
1219	LAKE HORSESHOE	0.034	0.130	459.000	12.067	11.500	0.023
1220	LAKE HOWELL	1.260	0.245	484.000	54.117	9.005	1.175
1221	LAKE ISTOKPOGA	0.033	0.120	464.222	6.594	8.600	0.010
1223	LAKE JESSUP	0.497	0.240	487.000	70.550	7.000	0.200
1224	LAKE KISSIMMEE	0.034	0.105	483.667	24.142	8.000	0.007
1227	LAKE LIZU	1.090	1.005	483.000	270.500	14.300	1.030
1228	LAKE MARION	0.000	0.200	488.833	29.467	7.600	0.010
1229	LAKE MINNEHAHA	0.037	0.000	433.000	8.733	7.700	0.012
1230	LAKE MINNEOLA	0.010	0.070	486.333	3.333	7.400	0.004
1231	LAKE MONROE	0.138	0.300	474.555	14.225	10.000	0.120
1232	LAKE OREECHOBEE	0.003	0.105	472.308	14.524	9.000	0.010
1234	LAKE POINSETT	0.005	0.150	484.000	6.500	14.600	0.031
1236	LAKE APOPKA	0.033	0.330	488.500	34.837	10.000	0.006
1238	LAKE SOUTH	0.074	0.130	484.000	23.167	9.000	0.022

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	SDD-MEAN SEC	MEAN CHLOPA	1S-MIN DO	MEDIAN DISS ORTHO P
1240	LAKE THONOTOSASSA	0.091	0.045	480.167	17.700	10.200	0.565
1241	LAKE TOHOPEKALIGA	0.246	0.200	472.917	30.633	10.500	0.192
1242	TROUT LAKE	1.110	0.650	472.000	76.567	12.900	0.470
1243	LAKE WEOHYAKAPKA	0.047	0.080	450.667	7.767	8.200	0.011
1246	LAKE YALE	0.027	0.160	441.000	25.367	7.600	0.014
1247	LAKE MUNSON	1.475	0.425	486.667	149.317	12.200	0.852
1248	LAKE SEMINOLE	0.234	0.175	473.833	102.000	6.000	0.020
1249	LAKE LAONE	7.500	1.250	494.667	84.900	10.400	0.117
1250	LAKE TARPON	0.041	0.070	480.889	8.867	9.000	0.027
1252	LAKE ELOISE	0.486	0.178	465.333	70.233	12.200	0.339
1256	LAKE JESSIE	0.051	0.090	452.667	26.200	10.400	0.011
1261	EAST LAKE TOHOPEKALIGA	0.042	0.070	440.833	5.167	9.400	0.007
1264	PAYNE'S PRAIRIE LAKE IND	1.200	0.140	470.000	98.200	7.400	1.210

ERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1201	ALLIGATOR LAKE	25 (10)	29 (10)	30 (12)	18 (7)	10 (4)	18 (7)	130
1202	LAKE APOPKA	50 (20)	38 (15)	10 (4)	38 (15)	74 (29)	70 (28)	280
1203	LAKE BANANA	23 (9)	29 (10)	20 (8)	5 (2)	100 (40)	23 (9)	200
1206	LAKE CRESCENT	65 (26)	70 (27)	33 (13)	80 (32)	48 (18)	50 (20)	346
1207	DOCTORS LAKE	60 (24)	76 (30)	60 (24)	55 (22)	34 (12)	56 (22)	341
1208	LAKE DORA	53 (21)	35 (14)	18 (7)	33 (13)	90 (35)	68 (27)	297
1209	LAKE EFFIE	5 (2)	10 (4)	3 (1)	3 (1)	0 (0)	10 (4)	31
1210	LAKE GEORGE	45 (18)	54 (21)	48 (19)	43 (17)	23 (9)	43 (17)	256
1211	LAKE GIBSON	40 (16)	81 (32)	45 (18)	70 (28)	48 (18)	40 (16)	324
1212	GLENADA LAKE	43 (17)	54 (21)	85 (34)	53 (21)	3 (1)	38 (15)	276
1214	LAKE GRIFFIN	48 (19)	29 (10)	23 (9)	30 (12)	95 (38)	48 (19)	273
1215	LAKE HAINES	70 (28)	81 (32)	75 (30)	58 (23)	34 (12)	78 (31)	396
1217	LAKE HANCOCK	18 (7)	43 (17)	13 (5)	13 (5)	98 (39)	28 (11)	213
1219	LAKE HORSESHOE	93 (37)	70 (27)	80 (32)	78 (31)	20 (8)	65 (26)	406
1220	LAKE HOWELL	11 (4)	23 (9)	69 (27)	35 (14)	60 (23)	3 (1)	201
1221	LAKE ISTOKPOGA	85 (34)	76 (30)	65 (26)	93 (37)	69 (27)	89 (35)	477
1223	LAKE JESSUP	28 (11)	18 (7)	5 (2)	25 (10)	83 (32)	25 (10)	184
1224	LAKE KISSIMMEE	90 (36)	63 (25)	73 (29)	65 (26)	65 (26)	99 (39)	455
1227	LAKE LULU	3 (1)	3 (1)	15 (6)	0 (0)	8 (3)	5 (2)	34
1228	LAKE MARION	78 (31)	29 (10)	53 (21)	50 (20)	83 (32)	73 (29)	366
1229	LAKE MINNEHAHA	88 (35)	91 (36)	95 (38)	85 (34)	78 (31)	80 (32)	517
1230	LAKE MINNEOLA	100 (40)	98 (39)	98 (39)	100 (40)	90 (35)	93 (37)	579
1231	LAKE MONROE	38 (15)	15 (6)	28 (11)	75 (30)	26 (10)	33 (13)	215
1232	LAKE OKEECHOBEE	68 (27)	45 (18)	40 (16)	73 (29)	53 (21)	89 (35)	368
1234	LAKE POINSETT	58 (23)	60 (24)	50 (20)	95 (38)	34 (12)	45 (18)	342
1236	LAKE WEEDY	95 (38)	13 (5)	55 (22)	45 (18)	34 (12)	95 (38)	337
1238	LAKE SOUTH	63 (25)	70 (27)	69 (27)	68 (27)	60 (23)	56 (22)	386
1239	LAKE TALQUIN	55 (22)	20 (8)	78 (31)	83 (33)	5 (2)	53 (21)	294

Reproduced from best available copy.

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	SOO-MEAN SEC	MEAN CHLOPA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1240	LAKE THONOTOSASSA	20 (8)	85 (34)	58 (23)	40 (16)	48 (18)	15 (6)	265
1241	LAKE TOHOPEKALIGA	33 (13)	46 (16)	38 (15)	48 (19)	40 (16)	30 (12)	229
1242	TROUT LAKE	15 (6)	8 (3)	43 (17)	23 (9)	13 (5)	8 (3)	110
1243	LAKE WEOHYAKAPKA	75 (30)	91 (36)	83 (33)	88 (35)	74 (29)	84 (33)	495
1246	LAKE YALE	98 (39)	58 (23)	90 (36)	63 (25)	83 (32)	75 (30)	467
1247	LAKE MUNSON	8 (3)	5 (2)	8 (3)	8 (3)	16 (6)	13 (5)	58
1248	LAKE SEMINOLE	35 (14)	48 (19)	35 (14)	10 (4)	69 (27)	63 (25)	260
1249	LAKE LAWNE	0 (0)	0 (0)	0 (0)	20 (8)	43 (17)	35 (14)	98
1250	LAKE TAHPON	83 (33)	98 (38)	100 (40)	90 (36)	58 (23)	60 (24)	491
1252	LAKE ELOISE	30 (12)	50 (20)	63 (25)	28 (11)	16 (6)	20 (8)	207
1258	LAKE JESSIE	73 (29)	88 (35)	88 (35)	60 (24)	26 (10)	84 (33)	419
1261	EAST LAKE TOHOPEKALIGA	80 (32)	98 (38)	93 (37)	98 (39)	55 (22)	99 (39)	523
1264	PAYNE'S PRAIRIE LAKE (NO	11 (4)	65 (26)	25 (10)	15 (6)	90 (35)	0 (0)	206

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	1230	LAKE MINNEOLA	579
2	1261	EAST LAKE TOHOPEKALIGA	523
3	1229	LAKE MINNEHAHA	517
4	1243	LAKE WEOHYAKAPKA	495
5	1250	LAKE TARPON	491
6	1221	LAKE ISTOKPOGA	477
7	1246	LAKE YALE	467
8	1224	LAKE KISSIMMEE	455
9	1258	LAKE JESSIE	419
10	1219	LAKE HORSESHOE	406
11	1215	LAKE HAINES	396
12	1238	LAKE SOUTH	386
13	1232	LAKE OKEECHOBEE	368
14	1228	LAKE MARION	366
15	1206	LAKE CRESCENT	346
16	1234	LAKE POINSETT	342
17	1207	DOCTORS LAKE	341
18	1236	LAKE REEDY	337
19	1211	LAKE GIBSON	324
20	1208	LAKE DORA	297
21	1239	LAKE TALQUIN	294
22	1202	LAKE APOPKA	280
23	1212	GLENADA LAKE	276
24	1214	LAKE GRIFFIN	273
25	1240	LAKE THONOTOSASSA	266
26	1248	LAKE SEMINOLE	260
27	1210	LAKE GEORGE	256
28	1241	LAKE TOHOPEKALIGA	229

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	1231	LAKE MONROE	215
30	1217	LAKE HANCOCK	213
31	1252	LAKE ELOISE	207
32	1264	PAYNE'S PRAIRIE LAKE (NO	206
33	1220	LAKE HOWELL	201
34	1203	LAKE BANANA	200
35	1223	LAKE JESSUP	184
36	1201	ALLIGATOR LAKE	130
37	1242	TROUT LAKE	110
38	1249	LAKE LAWNE	98
39	1247	LAKE MUNSON	58
40	1227	LAKE LULU	34
41	1209	LAKE EFFIE	31

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR FLORIDA 8/25/75

LAKE CODE 1258 LAKE JESSIE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 11.8

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1258A1	7.4	0.05	0.05	0.10	0.07	0.03	0.06	0.08	0.08	0.13	0.12	0.06	0.06	0.07
1258ZZ	4.4	0.03	0.03	0.06	0.04	0.02	0.03	0.05	0.05	0.08	0.07	0.04	0.03	0.04

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 11.8
SUM OF SUB-DRAINAGE AREAS = 11.8

TOTAL FLOW IN = 1.42
TOTAL FLOW OUT = 0.0

NOTE *** SEE WRITE UP ON WINTER HAVEN CHAIN OF LAKES

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1258A1	3	73	0.02	18	0.01				
	4	73	0.02	15	0.02				
	5	73	0.00	18	0.00				
	6	73	0.02	17	0.00				
	7	73	0.01	14	0.02				
	8	73	0.01	17	0.01				
	9	73	0.03	16	0.02				
	10	73	0.02	13	0.02				
	11	73	0.00	18	0.00				
	12	73	0.01	16	0.01				
	1	74	0.01	20	0.01				
	2	74	0.00	17	0.00				
1258ZZ	3	73	0.01	18	0.01				
	4	73	0.01	15	0.01				
	5	73	0.00	18	0.0				
	6	73	0.01	17	0.0				
	7	73	0.01	14	0.01				
	8	73	0.01	17	0.01				
	9	73	0.02	16	0.01				
	10	73	0.01	13	0.01				
	11	73	0.00	18	0.0				
	12	73	0.01	16	0.00				
	1	74	0.01	20	0.00				
	2	74	0.0	17	0.0				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/08/29

125801
28 03 23.0 081 45 48.0
LAKE JESSIE
12135 FLORIDA

11EPALES
3

2111202
0011 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/08	12 00	0000	24.0		60	200	9.00	41	0.040	0.900	0.050	0.007
	12 00	0004	23.1	10.2		200	8.90	42	0.040	0.800	0.040	0.006
	12 00	0007	20.5	8.8		200	8.30	42	0.040	0.900	0.050	0.010
73/09/04	17 20	0000	29.1	4.2	40	199	9.20	42	0.060	1.600	0.060	0.014
	17 20	0009	28.8	7.0		196	8.70	42	0.080	0.800	0.090	0.029
73/11/06	13 14	0000	23.8		42	170	7.10	31	0.060	0.800	0.030	0.019
	13 14	0001	23.8	8.2		170						
	13 14	0007	23.7	7.8		170	6.90	31	0.040	0.500	0.020	0.011

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/08	12 00	0000	0.039	20.8
	12 00	0004	0.036	
	12 00	0007	0.051	
73/09/04	17 20	0000	0.049	32.6
	17 20	0009	0.055	
73/11/06	13 14	0000	0.071	25.5
	13 14	0007	0.059	

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/08/25

12508A1
28 04 00.0 081 45 30.0
UNNAMED TRIBUTARY
12105 7.5 AUBURNDALE
T/LAKE JESSIE
US HWY 92 BRDG
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/03/18	10 00		0.105	0.490	0.020	0.035	0.055
73/04/15	15 45		0.024	0.595	0.030	0.040	0.080
73/05/18	12 22		0.084	1.440	0.390	0.115	0.620
73/06/17	14 15		0.115	4.950	0.399	0.240	4.200
73/07/14	11 40		0.074	2.310	0.450	0.315	1.680
73/08/17	14 05		0.080	1.760	0.160	0.024	0.075
73/09/16	09 55		0.075	0.750	0.044	0.008	0.050
73/10/13	11 05		0.030	3.200	1.230	0.017	0.040
73/11/18	11 27		0.120	0.550	0.020	0.016	0.050
73/12/16	15 00		0.088	1.100	0.052	0.048	0.075
74/01/20	14 52		0.088	0.600	0.036	0.025	0.072
74/02/17	15 00		0.160	1.800	0.085	0.070	0.310

28

TORET RETRIEVAL DATE 75/08/25

12580C AS1258DC P000100
28 03 30.0 081 46 20.0
FLAMINGO SHORES MOBILE HOME PARK
12 7.5 AUBURNDALE
U/LAKE JESSIE
LAKE JESSIE
11EPALES
4 2141204
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/04/16	11 00								
CP(T)- 73/04/16	16 00		33.000	1.000	1.000	7.900	7.900	0.005	0.005
73/05/15	11 00								
CP(T)- 73/05/15	16 00		39.000	1.300	0.175	11.000	11.500	0.004	0.004
73/06/17	11 00								
CP(T)- 73/06/17	16 00		31.400	1.000	0.066		8.000	0.002	0.002
73/07/18	11 00								
CP(T)- 73/07/18	16 00		11.400	0.260	0.190	8.300	8.600	0.002	0.002
73/08/20	11 00								
CP(T)- 73/08/20	16 00		15.200	1.260	0.080	7.000	7.500	0.002	0.002
73/09/17	11 00								
CP(T)- 73/09/17	16 00		0.030	0.430	0.170	0.425	0.430	0.003	0.003
73/10/14	11 00								
CP(T)- 73/10/14	16 00		24.000	0.500K	0.029	8.400	8.000	0.003	0.003
73/11/15	11 00								
CP(T)- 73/11/15	16 00		32.000	0.300	0.011	8.950	8.950	0.005	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED